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EUROPEAN PATENT APPLICATION.

21 Application number: 87108290.5

51 Int. Cl.⁴: **B01F 3/04**

22 Date of filing: 09.06.87

30 Priority: 11.06.86 IT 2223186 U

43 Date of publication of application:
16.12.87 Bulletin 87/51

84 Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

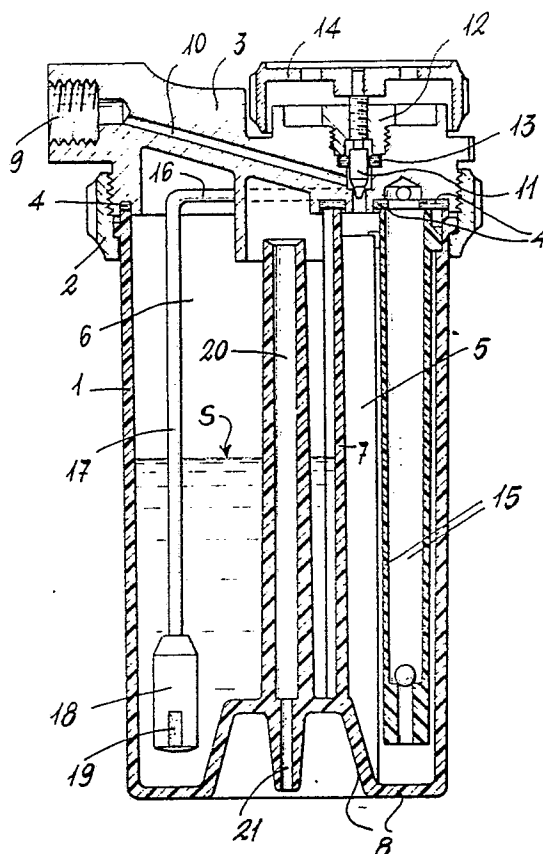
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54 **Oxygen moistening apparatus provided with a flow rate adjusting and metering device.**

57 Oxygen moistening apparatus provided with a flow rate adjusting and measuring device (15) comprising an at least partially transparent container (1) the inside of which is tightly divided into two discrete chambers (5, 6) and which may be tightly closed by a cover member (3) provided with an inlet hole (9) and adapted for coupling to an oxygen delivery pipe communicating with an outlet hole opening to the first (5) of the chambers. In the first chamber there is housed a flow rate measuring device (15) communicating with a dipping tube (17) having a free end and extending into the second chamber (6) of the container (1), with the free end located at the bottom (8) of the container. From said bottom a collecting tube (20) extends in the second chamber (6), having a free end and with its other end outwardly opening at a hole formed through the bottom (8) of the container, a shut off manually operated valve (13, 14) being mounted on the cover member.



Oxygen moistening apparatus provided with a flow rate adjusting and metering device

The present invention relates to an oxygen moistening apparatus provided with a flow rate adjusting and measuring device.

As is known, therapeutical use oxygen is administered to patients upon moistening by water. Presently the oxygen moistening operation is carried out by apparatuses including flow rate adjusting and measuring devices, which apparatuses are of comparatively large size, have poor handling characteristics and are very expensive.

The main objects of the invention is to provide a therapeutical use oxygen moistening apparatus which is of very reduced size, of simple and easy operation and which is provided with a flow rate measuring device which is protected against possible damages and which is particularly adapted for hospitals and home administering applications.

According to one aspect of the present invention the above and other objects are achieved by an oxygen moistening apparatus, characterized in that it comprises an at least partially transparent container the inside of which is tightly divided into two discrete chambers by means of a partition wall effective to be tightly closed by a cover member provided with an inlet hole to be coupled to an oxygen delivery pipe communicating, through a first channel formed in said cover member, with an outlet hole opening to the first of said two chambers, in said first chamber a flow rate measuring device being housed therethrough oxygen is caused to pass and communicating, through a second channel also formed in said cover member, with an elongated dipping tube having a free end, said dipping tube extending in the second of said two chambers with said free end located close to the bottom of said container, from said bottom there extending in said second chamber a collecting tube one end of which is free and opens close to said cover member, and the other end of which opens outwardly at a hole formed through the bottom of said container therein a fitting member is provided for coupling to a moistened oxygen delivery pipe, on said cover member a manually operated shut off valve being mounted for adjusting the oxygen flow rate from said inlet hole to said outlet hole of said apparatus.

In order to better understand the structure and characteristics of the oxygen moistening apparatus according to the present invention a preferred embodiment thereof will be disclosed thereafter with reference to the sole figure of the accompanying drawing in which the oxygen moistening apparatus is schematically shown by a longitudinal cross-sectional view.

In the drawing there is shown an oxygen moistening apparatus comprising a container 1 made of a transparent material on which there is fixedly mounted, through a threaded ring nut 2, a cover member 3 which passes against the free end of the container a tight gasket 4.

The container 1 is divided into two discrete chambers 5 and 6 by a partition wall 7 extending from the container bottom 8, and the top free edge of which tightly engages with the gasket 4 pressed by the cover member 3.

The cover member 3 is provided with an inlet hole 9 adapted for coupling to an oxygen delivery pipe (not shown) (for example at a pressure from 3 to 4 bars) which communicates, through a first channel 10, with an outlet hole opening to the above mentioned chamber 5: the channel 10 is shut off by a pin 11 having a threaded portion thereof engaging in a threaded hole of a gasket pusher 12 acting on an O-ring 13.

With the pin 15 a wheel 14 is rigid which may be manually operated so as to vary the free passage of the channel 10, thereby affording the possibility of easily adjusting (from a zero flow rate to a maximum flow rate) the oxygen amount passing through the channel in the time unit, as it should be apparent.

In the chamber 5 a flow rate measuring device 15 is housed, of known type, therethrough the oxygen from the channel 10 passes (from the bottom to the top as shown in the figure): this oxygen exits at the top end of the flow rate measuring device, passes through a channel 16 formed in the cover member and which has been schematically shown in the drawing, passes through an elongated dipping tube 17 the lower free end of which is provided with a cup 18 therethrough there are formed windows and in which there is housed a porous body 19 (also of known type) therethrough the oxygen is caused to pass so as to be dispersed in the water partially filling the chamber 6, to be fractioned in small bubbles and moistened.

The thus moistened oxygen bubbles are displaced above the water free surface S and pass, from the top to the bottom, through a collecting tube 20 the top free end of which opens close to the cover member 3 and the lower end of which opens at a hole formed through the container bottom 8: at this hole a lug 21 is provided thereto a duct (not shown) may be coupled for conveying the moistened oxygen (for example with a flow rate of 0,5 to 6 litres per minute) to the user.

The disclosed apparatus is of the so-called "bubbling" type, in which oxygen is caused to pass through water: it should however be apparent that the apparatus would also be able of operating in a water and the lower end of the pipe 17 is free, that is devoid of the porous body housing cup.

From the above disclosure it should be apparent that the moistening apparatus structure and use are very simple and, accordingly, of very reduced cost: thus the apparatus may be used in all of the places in which it will be necessary, for example in hospitals, as well as at the user home.

second chamber (6) being provided for holding water, and said apparatus being of the bubbling type.

Claims

1. An oxygen moistening apparatus provided with a flow rate adjusting and measuring device, characterized in that it comprises an at least partially transparent container (1) the inside of which is tightly divided into two discrete chambers (5, 6) by means of a partition wall (7) effective to be tightly closed by a cover member (3) provided with an inlet hole (9) to be coupled to an oxygen delivery pipe communicating, through a first channel (10) formed in said cover member, with an outlet hole opening to the first (5) of said two chambers, in said first chamber a flow rate measuring device (15) being housed therethrough oxygen is caused to pass and communicating, through a second channel (16) also formed in said cover member, with an elongated dipping tube (17) having a free end, said dipping tube extending in the second (6) of said two chambers with said free end located close to the bottom of said container, from said bottom there extending in said second chamber (6) a collecting tube (20) one end of which is free and opens close to said cover member, and the other end of which opens outwardly at a hole formed through the bottom of said container therein a fitting member (21) is provided for coupling to a moistened oxygen delivery pipe, on said cover member (3) a manually operated shut off valve (11) being mounted for adjusting the oxygen flow rate from said inlet hole (9) to said outlet hole of said apparatus.

2) An apparatus according to Claim 1, characterized in that said shut off valve consists of a pin (11) extending in said first channel (10) of said cover member (3) and which is rigid with a small wheel (14) which may be manually operated from outside, said pin having a threaded portion engaging in a threaded hole (12) formed in said cover member or in a body affixed thereto.

3) An apparatus according to claim 1 or 2, characterized in that the free end of said dipping tube (17) is provided with a cup (18) including openings and housing a porous body (19), said

